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ABSTRACT

This paper describes the use of a microcomputer model program to predict library collection growth at Cornell University, particularly in Olin Library, which is Cornell's central research facility. The possible effects of increased online information retrieval and microform or videodisc usage on library storage needs are also briefly discussed. A graph based on simple extrapolation of historical data illustrates Olin's increasing growth rate for nonbook items and decreasing growth rate for classified bound print volumes from 1973 to 2002. A table then presents annual historical data and projections to the year 2002 for Olin's gross acquisitions, items withdrawn, net volumes added, total classified volumes, number of volumes transferred to annex storage, number of volumes stored on-campus, linear feet of archive space, number of microform items, number of maps and other nonbook items, and total number of book and nonbook items. Appended tables show Olin's historical and projected ratios of growth rates and data converted from item counts to volume equivalents using the State University of New York (SUNY) equivalency factors. A summary table shows projected library collection size and stack floor area requirements for all 15 Cornell libraries from FY 1982 to 2002. Based on model projections, it is concluded that stock/storage space will have to be increased by over 50% by 2002. (ESR)

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Forecasting Library Futures: Participative Decisionmaking with a Microcomputer Model

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MIRA Incorporated, Planning and Information Research

ED238444

The purpose of this workshop is to demonstrate use of a microcomputer model program with direct participation of decisionmakers in shaping forecast of future changes from a historic database. The objective is to illustrate use of institutional research to inform institutional decisions on planning assumptions about long-term library collection growth in the face of rapid changes in information storage and retrieval technologies. These planning assumptions lead to decisions on capital investment in library plant and equipment to house and utilize the collections. They also influence operating budget allocations for acquisitions of library materials and administrative decisions on staffing library operations.

Twenty years ago major expansion of college and university library facilities was predicted largely on the basis of growing enrollments and on sustained acquisition of traditional printed books, documents, and periodicals. Today, even though enrollments are likely to decrease in many institutions, their library collections keep growing. Over the past ten years, the explosion of computer, microelectronic, and video technologies and emergence of international satellite communications have created much uncertainty about the nature and rates of change in the information systems to be used in libraries. Some futurists predict the disappearance of the library as a physical plant full of books and reader stations. They believe future libraries will be great electromagnetic databanks accessible by terminal communications from almost anywhere. That may happen in 20 years, but in the meantime many college and university libraries are becoming filled to capacity and are trying to plan for new kinds of resource and facility requirements.

Libraries now are quite advanced in the development of computer-access catalogs, bibliographic searches, research abstracts, and case material. Many emerging technologies of information storage and retrieval, however, are still in their infancy with uncertain rates of economic availability. Videodisk systems have the potential to store the equivalent of 40,000 volumes on a single disk, requiring 1/100th the amount of floor space consumed by 40,000 bound print volumes. Computer terminal access to electromagnetic storage banks located across the country and on the other side of the world now are available, with satellite communications costs expected to become more economical. The younger generations of users increasingly are accustomed to reading from a videoscreen and to hands-on computer use.

How can colleges and universities forecast and plan for these anticipated but uncertain changes in library collections, operations, and physical plant?

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The Example Planning Problem: Cornell University Libraries

This workshop demonstration model was developed for a study of 15 Cornell University Libraries and the library of Canisius College, a small liberal arts institution.[1] The model is used to estimate potential future growth of collections and changes to new forms of microelectronic information storage and retrieval, replacing portions of traditional print media. A ten-year history of actual collection growth by types of materials is displayed in the model. Average rates of change of each type over the past ten years are computed. The computer model was taken to the institution for the library staff to play the forecasting game. Initially, projection for the next 20 years that simply extrapolated those historic rates of change into annual collection growth. Direct participation of the librarians, themselves, shaped the judgmental decisions, letting them make changes in forecasting assumptions to immediately see the consequences of different assumptions on magnitudes of collection growth generated on the computer model.

Five years ago, in 1978, Cornell University Libraries opened the first module of the Library Annex, located in an off-campus orchard area about 1-1/2 mile from the central Olin Library. The Annex is a warehouse shell filled with a high-density stack storage structure. It has a capacity for 330,000 bound volumes and 28,000 cubic feet of archives and manuscripts. Its intent is to move older, less active books, archives, and periodicals out of the central campus libraries at lower capital cost than expansion of those libraries.

The first module of the Library Annex is nearly full. At the end of fiscal year 1981-82, the Annex housed 309,000 bound volumes in an estimated capacity of 332,000. In 1981-82, 12,600 volumes were transferred to Annex storage. At that rate, the remaining bound volume capacity will be full in this year. Archival material totals 25,328 cubic feet in a capacity for 28,350 cubic feet. That capacity will be exhausted by 1986.

This study was initiated to examine options for facilities programming of a second module of the Library Annex. As consultants, we applied the same projection model developed for two library facilities programming studies to all other individual libraries on the Ithaca campus and at Geneva. Using the actual computer model hands-on, we reviewed forecasting assumptions with the library staff on July 6 and 7, 1983, in order to refine the projections of potential loading of future Annex additions and to determine the extent to which those libraries should be expanded on-campus.

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[1] The initial model was developed for the following reports: Thomas R. Mason, MIRA Incorporated, with J.E. Robinson: Facilities Program Plan for the Expansion and Renovation of the Albert R. Mann Library (April 1983); Facilities Program Plan for the Expansion and Renovation of the Martin P. Catherwood Library (May 1983); Facilities Program Plan for Twenty-Year Library Development at Canisius College (April 1983). Revised projections for the 15 Cornell University Libreries, now being reviewed by library staff, are in Evan Newton, MIRA Incorporated, Collection Growth Projections for Cornell University Libraries, 1982 - 2002 (August 1983).

An underlying question behind the review is whether the need to store more and more material off-campus in the expanded Annex (with closed stacks requiring staff retrieval and transportation) involves operating cost escalation that will make capital investment in expansion of the libraries on campus (with mostly open-access stacks) more economical.

The key forecasting assumption question: **At what rates will new micromedia information storage and retrieval technologies, with much higher density storage requirements, begin to replace and reduce acquisitions of printed bound volumes?**

A projection of potential growth of Olin Library, Cornell's main central research library, will used as a working example in this workshop.

Immediately following this text, a graph illustrates the Projection of Collections in the Olin Library. That illustrates the increasing rate of "micromedia" growth, especially after 1990, and a decreasing rate of growth for the classified bound print volumes that occupy the bulk of library stack space.

Then, the following tables are produced from one modeling of collection growth for the Olin example:

Table 1.1 is the main model for projection of Olin Library collections by types of material. The Sheet 1 of Table 1.1 shows the 10-year history of bound volume collection growth from 1972-73 through 1981-82 and the five years 1976-77 through 1982-82 for nonbook materials.[2] Sheet 2 of Table 1.1 shows projections from one set of assumptions for collection growth by type for the next 20 years.

Table A-1.1 is an appendix table showing the ratios of library growth rates of each category over the past ten years and projection rates for the next 20 years.

Table A-2.1 shows the conversion for the past six years of microform, electromagnetic, and other materials from item counts to volume equivalents using the equivalency factors of the State University of New York (SUNY). These factors are shown because four of the Cornell Libraries are "Statutory" SUNY-funded libraries. However, for the other 11 "Endowed" Cornell libraries, higher-density space factors for nonbook materials are being considered. Therefore, example Table A-2.1 (extension) shows the projections for micromedia types of materials for Olin Library as item counts, not converted to volume equivalents.

Column 1 on Table 1.1 for Olin, shows the gross acquisitions. The rates of change for the past ten years in terms of the ratio of gross aquisitions to the prior year classified volume total shown on Table A-1.1 averaged 2.56% for the past 10 years.

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[2] The data for the past 10 years are derived from annual reports (with a few corrections), from the "Growth of the Libraries" worksheets prepared by Arthur Kulp, Coordinator of Facilities for the Cornell University Libraries, and from additional data on nonprint materials provided by Arthur Kulp in letters to T.R. Mason, May 26 and June 22, 1983.

The projections on Sheet 2 of Table 1.1 assume acquisition of 60,000 bound volumes a year from 1982 to 1990. The Workshop Trial Model assumes continuation of the same percentage rate as the past ten-year average, generating increasing numbers of gross volumes added. After 1990, both the projection in this paper and the Workshop model assume gross volumes added will decrease 2,000 a year, replaced by nonbook types of materials.

Column 2 shows the Items Deleted. The average deletion rate of 0.12 percent per year is projected through 2001-02, increasing deletions from 2,900 to 4,000 bound volumes per year.

Column 3 of Table 1.1 shows the Net Volumes Added (Gross Added less Items Withdrawn).

Column 4 accumulates the Net Volumes Added to the prior year count of bound volumes to produce the Total Classified Volumes count.

Column 5 shows the bound volumes assumed for Transfer to Annex Since it opened in 1978, 194,000 bound volumes have been transferred from Olin, over 60 percent of volumes now housed in the Annex.

Next comes a critical factor: The 320,644 linear feet of shelving in Olin has a capacity (at the norm of 86%) of nearly 2,250,000 bound volumes. That the bound classified volume capacity of Olin Library will be full by 1986. However, planning now is underway to remodel the lower level of the Olin Library into high-density, compact movable shelving, increasing its capacity by 250,000 volumes to 2,500,000. The sample projection on Sheet 2 of Table 1.1 assumes that 10,000 bound volumes each year will be transferred to the Annex until the new 2.5 million capacity is reached in 1988-89. After that, the assumption is that the number equal to net volumes added each year will have to be rotated to the expanded Annex. By 1990, the total volumes transferred from Olin, alone, will exceed the capacity of the existing first module of the Annex. By the year 2002, Olin will have transferred nearly 900,000 volumes to the Annex by these assumptions.

In Columns 7-9 of Table 1.1, the linear feet of Archives and item counts of Micromedia Units and other types of materials are shown. (Table A-1.2 shows the past five years growth of each type of nonbook materials, converted to SUNY volume equivalents.)

Column 7 shows that the Archive collections in Olin will be held constant at 15,800 linear feet beginning this year. Over 20,000 cubic feet of archives and manuscripts already have been transferred from Olin to the Annex. From Olin and other libraries, archive and manuscript collections are growing at about 800 cubic feet per year. Since the existing Annex archive capacity will be full by 1986, that will be an additional factor (not yet analyzed) to determine how much the Annex will have to be expanded.

Column 8 shows historic and projected "Micromedia" item counts for Olin Library. The combined types of microfilm reels, disks, cassettes, microfiche, and other microprint totalled as "Micromedia" come from Table A-2.1 (Extension). It shows the item count projections for each type of "Micromedia" tentatively increased 5% a year to 1990, then increased by 7.5% a year from 1990 to 2002 to reflect assumed increased use of Micromedia. These tentative assumptions are applied equally to each type of Micromedia.

The tricky planning problem will be to estimate how each type of Micromedia is likely to grow. Very likely, videodisk forms will increase more significantly; microfilm and microfiche types are not likely to increase at these rates. How should these forecast assumptions be changed?

Column 9 shows the item counts in Olin for maps, opaques, and sheets (e.g. prints). These are projected at the historic rate to 1990, then decrease to a lower ratio of additions to the prior year count.

The Workshop Trial model deals with all of the Micromedia forms collectively. These represent materials to be housed in the campus libraries. If more and more of the nonbook materials are in electromagnetic forms, often in data banks located elsewhere, can lower item count projections be assumed? More and more of the storage can be off-campus with retrieval by terminal. That means that more and more terminals will be required on-campus, partly offsetting floor area saved by ultrahigh-density storage.

Column 10, Total Items All Types, adds the bound volume count, linear feet of archives, and item counts of other types of collections. This mix of apples and oranges simply shows the magnitude of numbers of units that must be accounted for in inventories, catalogs, and stack or other storage units. Even with the bound volume count held constant, the total item count in Olin Library doubles over the next 20 years. It can only house those quantities through much higher density storage systems on-campus, as well as greatly increased capacity for off-campus Annex storage.

To show total magnitude of library collection growth at Cornell, Summary Table 2 combines the actual count for all 15 libraries in 1982 and their current (tentative) projections to 1990 and to 2002. These show that the Annex bound volume capacity will have to be expanded four-fold by 2002 unless more on-campus library expansion is built. While total classified bound volumes will increase nearly 50 percent in 20 years, the nonbook high-density forms will more than triple. Applying the WICHE-California unit floor area criteria to these collection counts, the stack/storage space will have be increased from 294,000 assignable square feet (by formula) in 1982 to nearly 450,000 assignable square feet (over 50 percent) in the year 2002. Facing this magnitude of potential capital outlay for library collection storage alone, Cornell University Libraries and the University Administration are likely to become vigorous advocates of more rapid implementation of the new ultra-high-density information storage systems.

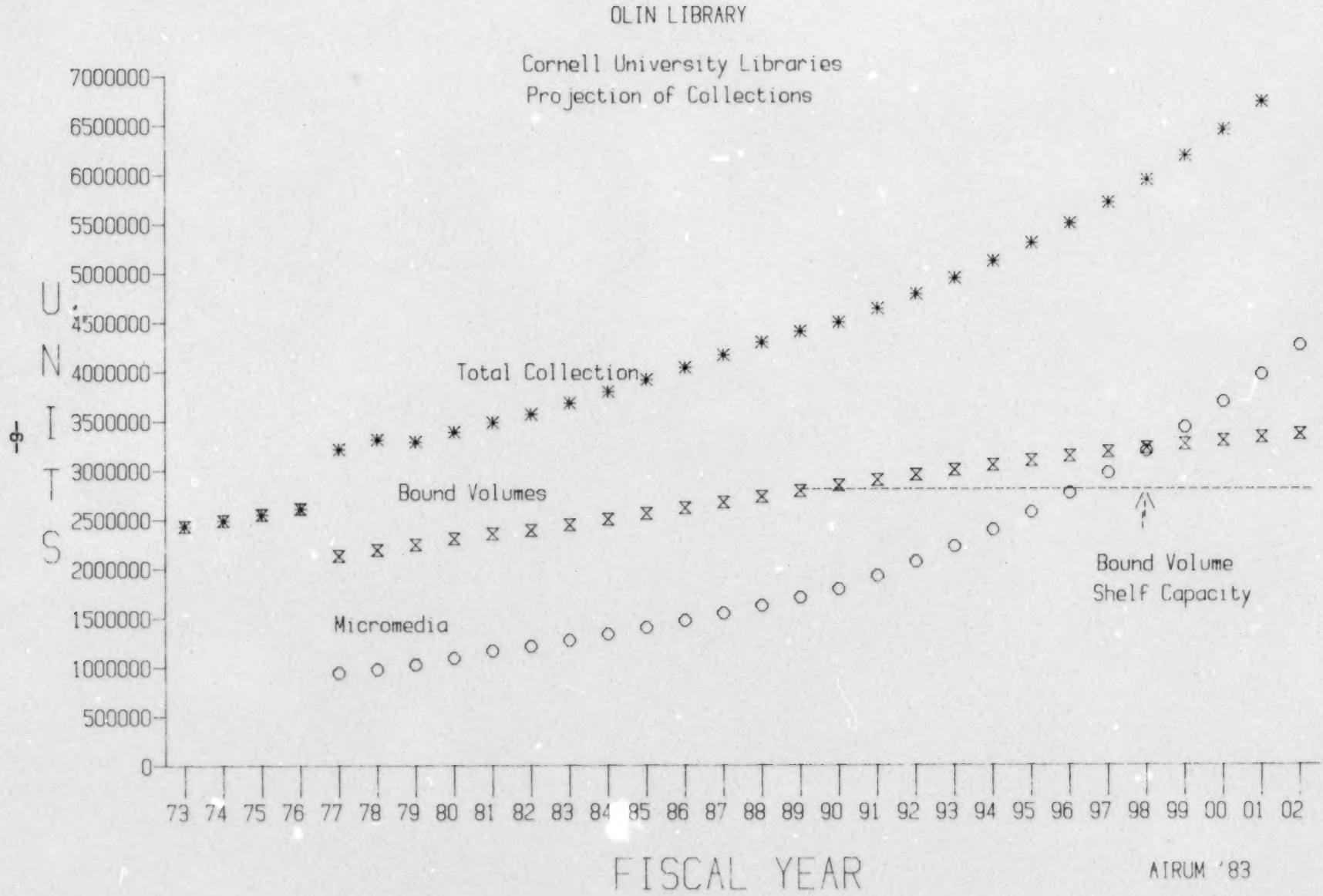
OLIN LIBRARY
Cornell University Libraries
Projection of Collections
UNITS
7000000
6500000
6000000
5500000
5000000
4500000
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
Total Collection
Bound Volumes
Micromedia
Bound Volume
Shelf Capacity
73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02
FISCAL YEAR
AIRUM '83

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Table 1.1
OLIN LIBRARY
Cornell University Libraries
Ten Year History and Twenty Year Projection

Actual 1973-1982
Revise-4: 8/30/83
AIRUM Model 9/30/83

PROJECTION OF LIBRARY COLLECTIONS
by Type of Collection Materials

Fiscal YEAR	CLASSIFIED BOUND VOLUME GROWTH: GROSS Added	Items Withdrawn	NET Volumes ADDED	TOTAL CLASSIF. VOLUMES	Transfer to Annex	Bound VOLUMES in OLIN	ARCHIVES (Linear Feet)	MICRO-media Units	MAPS, Opaques Sheets	Total Items All Types
	1	2	3	4	5	6	7	8	9	10
								Table A-2		
1972-73	93,299	2,709	90,590	2,430,620		2,430,620				2,430,620
1973-74	60,718	1,905	58,813	2,489,433		2,489,433				2,489,433
1974-75	63,810	1,536	62,274	2,551,707		2,551,707				2,551,707
1975-76	59,442	978	58,464	2,610,171		2,610,171				2,610,171
**1976-77	54,604	1,265	53,339	2,132,125	Annex	2,132,125	16,907	941,255	123,494	3,213,781
1977-78	60,996	1,204	59,792	2,191,917	Opened:	2,191,917	17,082	978,877	126,513	3,314,389
1978-79	55,204	724	54,480	2,246,397	130,918	2,115,479	17,397	1,027,206	132,055	3,292,137
1979-80	61,231	0	61,231	2,307,528	30,195	2,146,515	14,736	1,093,284	135,733	3,390,268
1980-81	51,387	2,320	49,067	2,356,695	31,673	2,163,909	15,284	1,167,241	142,013	3,488,447
1981-82	47,127	13,671	33,456	2,390,151	1,224	2,196,141	15,791	1,212,531	146,472	3,570,935
** Corrected Count				Annex =	194,010					
10-Year Change:							Five Year Change:			
Sum	607,818	26,312	581,506		194,010	-234,479	-1,116	271,276	22,978	357,154
Avg./Year	60,782	2,631	58,151		48,503	-26,053	-223	54,255	4,596	71,431
Avg. Change % prior Year Collection:							Avg. Change % Prior Year:			
	2.58%	0.111%	2.47%				-1.076%	5.20%	3.48%	4.49%

NOTE: Olin shelf capacity of 2,250,000 volumes could be increased to 2,500,000 by converting the lower level's 18,750 square feet to high density shelving.

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Table 1.1 (continued)
OLIN LIBRARY
Cornell University Libraries
PROJECTION OF LIBRARY COLLECTIONS

Fiscal YEAR	CLASSIFIED BOUND VOLUME GROWTH: GROSS Added (1)	Items Withdraw (2)	NET Volumes ADDED (3)	TOTAL CLASSIF. VOLUMES (4)	Transfer to Annex (5)	Bound VOLUMES in OLIN (6)	ARCHIVES (Linear Feet) (7)	Micro-media Units (8)	Maps, Opaques Sheets (9)	Total Items All Types (10)
PROJECTED 1983-1990: Assume: Constant: V @ 60,000	Delete 0.12%	NET ADDED	Note: Olin capacity of 2,500,000 volumes is reached by 1988-89.				Table A-2 Rate of Increase Assumed: 0.000	1.050	1.035	
1982-83	60,000	2,900	57,100	2,447,300	10,000	2,243,300	15,800	1,273,200	151,600	3,683,900
1983-84	60,000	2,900	57,100	2,504,400	10,000	2,290,400	15,800	1,336,900	156,900	3,800,000
1984-85	60,000	3,000	57,000	2,561,400	10,000	2,337,400	15,800	1,403,700	162,400	3,919,300
1985-86	60,000	3,100	56,900	2,618,300	10,000	2,384,300	15,800	1,473,900	168,100	4,042,100
1986-87	60,000	3,100	56,900	2,675,200	10,000	2,431,200	15,800	1,547,600	174,000	4,168,600
1987-88	60,000	3,200	56,800	2,732,000	10,000	2,478,000	15,800	1,625,000	180,100	4,298,900
1988-89	60,000	3,300	56,700	2,788,700	34,700	2,500,000	15,800	1,706,300	186,400	4,408,500
1989-90	60,000	3,300	56,700	2,845,400	56,700	2,500,000	15,800	1,791,500	192,900	4,500,200
				Annex =	345,410					
PROJECTED 1991-200 Assume: Decrease: -2,000/yr	Delete: 0.12%	NET ADDED			To Annex:	In Olin:	Rate of Increase Assumed: 0.000	1.075	1.025	
1990-91	58,000	3,400	54,600	2,900,000	54,600	2,500,000	15,800	1,925,900	197,700	4,639,400
1991-92	56,000	3,500	52,500	2,952,500	52,500	2,500,000	15,800	2,070,300	202,600	4,788,700
1992-93	54,000	3,500	50,500	3,003,000	50,500	2,500,000	15,800	2,225,600	207,700	4,949,100
1993-94	52,000	3,600	48,400	3,051,400	48,400	2,500,000	15,800	2,392,500	212,900	5,121,200
1994-95	50,000	3,700	46,300	3,097,700	46,300	2,500,000	15,800	2,571,900	218,200	5,305,900
1995-96	48,000	3,700	44,300	3,142,000	44,300	2,500,000	15,800	2,764,800	223,700	5,504,300
1996-97	46,000	3,800	42,200	3,184,200	42,200	2,500,000	15,800	2,972,200	229,300	5,717,300
1997-98	44,000	3,800	40,200	3,224,400	40,200	2,500,000	15,800	3,195,100	235,000	5,945,900
1998-99	42,000	3,900	38,100	3,262,500	38,100	2,500,000	15,800	3,434,700	240,900	6,191,400
1999-2000	40,000	3,900	36,100	3,298,600	36,100	2,500,000	15,800	3,692,300	246,900	6,455,000
2000-01	38,000	4,000	34,000	3,332,600	34,000	2,500,000	15,800	3,969,200	253,100	6,738,100
2001-02	36,000	4,000	32,000	3,364,600	32,000	2,500,000	15,800	4,266,900	259,400	7,042,100
				Annex =	864,610					

PROJECTION BASE: ANALYTIC ESTIMATES
Library Change Rates, 1972-1982; Projection Rates 1982-83 to 2001-02

YEAR	Gross acq./ prior yr	Deletions /prior yr Collect'n	Net Acq. /prior yr	Archives Increase Rate (I)	Micro-media Rate (J)	Maps, Opaques Rate (K)	TOTAL Items Annual Increase
	(1971 vol	2340030)					
1972-73	.0398709	.0011577	.0387132				3.87%
1973-74	.0249805	.0007838	.0241967				2.42%
1974-75	.0256323	.000617	.0250153				2.50%
1975-76	.023295	.0003833	.0229117				2.29%
1976-77	.0209197	.0004846	.0204351				23.13%
1977-78	.0286081	.0005647	.0280434	.0103507	.03997	.0244465	3.13%
1978-79	.0251853	.0003303	.024855	.0184405	.0493719	.0438058	-0.67%
1979-80	.0272574	0	.0272574	-.152957	.0643279	.027852	2.98%
1980-81	.0222683	.0010054	.021263	.0371878	.0676466	.0462673	2.90%
1981-82	.0199971	.0058009	.0141962	.0331719	.0388009	.0313985	2.36%
3-Yr Av	.0231743	.0022688	.0209055	-.027533	.0569251	.0351726	2.75%
10-yr Av	.0258015	.0011128	.0246887	-.010761	.0520235	.034754	4.49%
				(5 yr.av)	(5 yr.av)	(5 yr.av)	
PROJECTION RATES 1983-1990							
1982-83	.025103	.0012133	.0238897	.0005699	.050035	.0350101	3.16%
1983-84	.0245168	.001185	.0233318	0	.0500314	.0349604	3.15%
1984-85	.0239578	.0011979	.0227599	0	.0499663	.0350542	3.14%
1985-86	.0234247	.0012103	.0222144	0	.0500107	.0350985	3.13%
1986-87	.0229156	.001184	.0217317	0	.0500034	.0350982	3.13%
1987-88	.0224282	.0011962	.0212321	0	.0500129	.0350575	3.13%
1988-89	.0219619	.0012079	.020754	0	.0500308	.0349806	2.55%
1989-90	.0215154	.0011833	.0203321	0	.0499326	.0348712	2.08%
							2.93%
PROJECTION RATES 1991-2002							
1990-91	.0203838	.0011949	.0191889	0	.0750209	.0248834	3.09%
1991-92	.0193103	.0012069	.0181034	0	.0749779	.024785	3.22%
1992-93	.0182896	.0011854	.0171041	0	.0750133	.0251728	3.35%
1993-94	.017316	.0011988	.0161172	0	.074991	.0250361	3.48%
1994-95	.0163859	.0012126	.0151734	0	.0749843	.0248943	3.61%
1995-96	.0154954	.0011944	.0143009	0	.0750029	.0252062	3.74%
1996-97	.0146404	.0012094	.0134309	0	.0750145	.0250335	3.87%
1997-98	.0138182	.0011934	.0126248	0	.074995	.0248583	4.00%
1998-99	.0130257	.0012095	.0118162	0	.0749898	.0251064	4.13%
1999-2000	.0122605	.0011954	.0110651	0	.0749993	.0249066	4.26%
2000-01	.01152	.0012126	.0103074	0	.0749939	.0251114	4.39%
2001-02	.0108024	.0012003	.0096021	0	.0750025	.0248913	4.51%
							3.80%

OLIN LIBRARY
Cornell University Libraries

MICROFORM, ELECTROMAGNETIC, AND OTHER MATERIALS
Conversion to Volume Equivalents for Floor Area
by
Equivalency Factors of State University of New York

CATEGORIES OF MATERIALS BY SUNY VOLUME EQUIVALENCY FACTOR GROUPS:

Fiscal Year	REELS Microflm Movies Tapes	DISCS CASSETTE Filmloop	SLIDES Ovrhds Pic-tures	MICRO Fiche Print Cards	TOTAL Units MICRO-MEDIA	GOV'T Dcmnts Pmphlt	MAPS, Opaques	ARCHIVES Manuscr. LINEAR FEET	TOTAL Items or Vol. Equivs.
UNITS - ITEMS:									Items
1976-77	76,795	2,678	0	861,782	941,255	0	123,494	16,907	1,081,656
1977-78	79,460	2,718	0	896,699	978,877	0	126,513	17,082	1,122,472
1978-79	82,840	2,756	0	941,610	1,027,206	0	132,055	17,397	1,176,658
1979-80	87,374	3,373	0	1,002,537	1,093,284	0	135,733	14,736	1,243,753
1980-81	90,255	3,937	0	1,073,049	1,167,241	0	142,013	15,284	1,324,538
1981-82	92,737	4,107	0	1,115,687	1,212,531	0	146,472	15,791	1,374,794
CHANGE:	15,942	1,429	0	253,905	271,276	0	22,978	-1,116	293,138
Avg/Year	3,188	286	0	50,781	54,255	0	4,596	-223	58,628
CONVERSION TO VOLUME EQUIVALENTS:					Micromed				Volume
Vol:Units	1.000	0.500	0.250	0.125	Vol.Eqv.	0.800	0.140	14.29	Equival.
1976-77	76,795	1,339	0	107,723	185,857	0	17,289	241,601	444,747
1977-78	79,460	1,359	0	112,087	192,906	0	17,712	244,102	454,720
1978-79	82,840	1,378	0	117,701	201,919	0	18,488	248,605	469,012
1979-80	87,374	1,687	0	125,317	214,378	0	19,003	210,573	443,953
1980-81	90,255	1,969	0	134,131	226,355	0	19,882	218,406	464,642
1981-82	92,737	2,054	0	139,461	234,251	0	20,506	225,658	480,415
Avg.Incr.	3,188	143	0	6,348	9,679	0	643	-?,189	7,134

1981-82 % Volume Equiv./Items = 34.94%

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Table A-2.1 (extension)
Micro-Media
Individual Item Count Projections
OLIN LIBRARY
Cornell University Libraries
Revision 4 Projection

9/30/83
AIRUM

Fiscal Year	REELS Microfilm Movies Tapes	DISCS Cassette Filmloop	MICRO Fiche, Print Cards	Total Micromedia Units
1977-82	Avg. rate of increase/prior yr			5.20%
5-yr avg.	4.15%	10.67%	5.89%	5.76%
	PROJECTION, 1982-1990:			
	Assumed rate of increase/prior year =			5.00%
1981-82	92,737	4,107	1,115,687	1,212,500
1982-83	97,374	4,312	1,171,471	1,273,200
1983-84	102,243	4,528	1,230,045	1,336,800
1984-85	107,355	4,754	1,291,547	1,403,700
1985-86	112,722	4,992	1,356,125	1,473,800
1986-87	118,359	5,242	1,423,931	1,547,500
1987-88	124,276	5,504	1,495,127	1,624,900
1988-89	130,490	5,779	1,569,884	1,706,200
1989-90	137,015	6,068	1,648,378	1,791,500
	Average annual % change, 1982-1990 =			5.31%
	PROJECTION, 1990-2002:			
	Assumed rate of increase/prior year =			7.50%
1990-91	147,291	6,523	1,772,006	1,925,800
1991-92	158,338	7,012	1,904,907	2,070,300
1992-93	170,213	7,538	2,047,775	2,225,500
1993-94	182,979	8,104	2,201,358	2,392,400
1994-95	196,702	8,711	2,366,460	2,571,900
1995-96	211,455	9,365	2,543,944	2,764,800
1996-97	227,314	10,067	2,734,740	2,972,100
1997-98	244,363	10,822	2,939,845	3,195,000
1998-99	262,690	11,634	3,160,334	3,434,700
1999-00	282,392	12,506	3,397,359	3,692,300
2000-01	303,571	13,444	3,652,161	3,969,200
2001-02	326,339	14,452	3,926,073	4,266,900
	Average annual % change, 1990-2002 =			10.13%

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Summary Table 2
CORNELL UNIVERSITY LIBRARIES
(Ithaca Campus & Geneva)
PROJECTED LIBRARY COLLECTIONS & STACK FLOOR AREA REQUIREMENTS
From Fiscal Year 1982 to 2002

9/30/83
Summary of
Tables 1
Series
Revision-4

Collection Count end of Fiscal Year	<—Classified Bound Volumes—> TOTAL CLASSIF. BOUND VOLUMES (4)	Bound Volumes in ANNEX (5)	Bound VOLUMES On-campus Libraries (6)	<——Nonbook Item Count——> REELS Microflm Movies Tapes (7)	DISCS CASS-ETTES Flmlp (8)	MICRO Fiche Print Cards (9)	* OTHER (10)	Total Items in On-campus Libraries (11)	TOTALS in Annex & On-campus Libraries
1981-82 ACTUAL	4,357,365	309,034	4,048,331	106,444	42,546	2,599,405	370,594	7,167,320	7,476,354
1989-90 PROJECTED	5,241,490	519,290	4,722,200	167,890	154,830	5,227,740	461,950	10,734,610	11,253,900
2001-02 PROJECTED	6,396,700	1,316,800	5,079,900	445,000	733,100	12,515,800	723,400	19,497,200	20,814,000
% 20-YEAR CHANGE	46.80%	326.10%	25.48%	318.06%	1623.1%	381.49%	95.20%	172.03%	178.40%
Annual Average	2.34%	16.31%	1.27%	15.90%	81.15%	19.07%	4.76%	8.60%	8.92%
** WICHE-California Unit Floor Area Criteria:								STACK ASF Formula Floor Area On-Campus	STACK ASF Annex & On-campus Libraries
ASF Floor Area/Item (x)		0.0500	0.0667	0.0218	0.0174	0.0009	0.0087		
Items/ASF Floor Area (1/x)		20.0	15.0	46.0	57.5	1149.4	114.9		
Formula ASF 1982		15,452	270,024	2,315	740	2,261	3,224	278,565	294,016
Formula ASF 1990		25,965	314,971	3,652	2,694	4,548	4,019	329,883	355,848
Formula ASF 2002		65,840	338,829	9,679	12,756	10,889	6,294	378,446	444,286
INCREASE Stack ASF, 2002/1982		326.1%	25.5%	318.1%	1623.1%	381.5%	95.2%	35.9%	51.1%

* OTHER column covers linear feet of archives, manuscripts, pamphlets; item counts of maps, opaques, sheets, and sheet music in particular on-campus libraries. Floor Area factor is for pamphlets, documents.

** From Harold L. Dahnke, Dennis P. Jones, Thomas R. Mason, and Leonard C. Romney, HIGHER EDUCATION FACILITIES PLANNING AND MANAGEMENT MANUALS (Boulder, CO: Planning & Management Division, Western Interstate Commission for Higher Education, now the National Center for Higher Education Management Systems, 1971), Manual 4, ACADEMIC SUPPORT FACILITIES, page 61. This adapts the "University of California Planning Guide for Libraries: Unit Area Allowances" (Office of the President, May 26, 1968).

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Table 1.1
OLIN LIBRARY
Cornell University Libraries
Ten Year History and Twenty Year Projection

Actual 1973-1982
Revise-5:
AIRUM Model 9/30/83

PROJECTION OF LIBRARY COLLECTIONS
by Type of Collection Materials

Fiscal YEAR	CLASSIFIED BOUND VOLUME GROWTH: GROSS Added (1)	Items Withdrawn (2)	NET Volumes ADDED (3)	TOTAL CLASSIF. VOLUMES (4)	Transfer to ANNEX (5)	Bound VOLUMES in OLIN (6)	ARCHIVES (Linear Feet) (7)	MICRO-media Units (8)	MAPS, Opaques Sheets (9)	Total Items All Types (10)
								Table A-2		
1972-73	93,299	2,709	90,590	2,430,620		2,430,620				2,430,620
1973-74	60,718	1,905	58,813	2,489,433		2,489,433				2,489,433
1974-75	63,810	1,536	62,274	2,551,707		2,551,707				2,551,707
1975-76	59,442	978	58,464	2,610,171		2,610,171				2,610,171
**1976-77	54,604	1,265	53,339	2,132,125	Annex	2,132,125	16,907	941,255	123,494	3,213,781
1977-78	60,996	1,204	59,792	2,191,917	Opened:	2,191,917	17,082	978,877	126,513	3,314,389
1978-79	55,204	724	54,480	2,246,397	130,918	2,115,479	17,397	1,027,206	132,055	3,282,137
1979-80	61,231	0	61,231	2,307,628	30,195	2,146,515	14,736	1,083,284	135,733	3,390,268
1980-81	51,387	2,320	49,067	2,356,695	31,673	2,163,909	15,284	1,167,241	142,013	3,488,447
1981-82	47,127	13,671	33,456	2,390,151	1,224	2,196,141	15,791	1,212,531	146,472	3,570,935
** Corrected Count				Annex =	194,010					
10-Year Change:							Five Year Change:			
Sum	607,818	26,312	581,506		194,010	-234,479	-1,116	271,276	22,978	357,154
Avg./Year	60,782	2,631	58,151		48,503	-26,053	-223	54,255	4,596	71,431
Avg. Change % Prior Year Collection:				Note: Olin capacity of			Avg. Change % Prior Year:			
	2.58%	0.111%	2.47%	2,500,000 volumes is			-1.076%	5.20%	3.48%	4.49%
				reached by 1988-89.						
PROJECTED 1983-1990:	Delete	NET					Rate of Increase Assumed:			
Assume: Constant:	0.12%	ADDED:		TO ANNEX:	In Olin:		0.000	1.055	1.035	
V 2.58%										
1982-83	61,700	2,900	58,800	2,449,000	10,000	2,245,000	15,800	1,279,200	151,600	3,691,600
1983-84	63,200	2,900	60,300	2,509,300	10,000	2,295,300	15,800	1,349,600	156,900	3,817,600
1984-85	64,700	3,000	61,700	2,571,000	10,000	2,347,000	15,800	1,423,800	162,400	3,949,000
1985-86	66,300	3,100	63,200	2,634,200	10,000	2,400,200	15,800	1,502,100	168,100	4,086,200
1986-87	68,000	3,200	64,800	2,699,000	10,000	2,455,000	15,800	1,584,700	174,000	4,229,500
1987-88	69,600	3,200	66,400	2,765,400	21,400	2,500,000	15,800	1,671,900	180,100	4,367,800
1988-89	71,400	3,300	68,100	2,833,500	68,100	2,500,000	15,800	1,763,900	186,400	4,466,100
1989-90	73,100	3,400	69,700	2,903,200	69,700	2,500,000	15,800	1,860,900	192,900	4,569,600
				Annex =	403,210					
PROJECTED 1991-200			NET				Rate of Increase Assumed:			
Assume: Decrease:	Delete:		ADDED:		TO ANNEX:	In Olin:	0.000	1.100	1.025	
-2,000/yr	0.12%									
1990-91	71,100	3,500	67,600	2,970,800	67,600	2,500,000	15,800	2,047,000	197,700	4,760,500
1991-92	69,100	3,600	65,500	3,036,300	65,500	2,500,000	15,800	2,251,700	202,600	4,970,100
1992-93	67,100	3,600	63,500	3,099,800	63,500	2,500,000	15,800	2,476,900	207,700	5,200,400
1993-94	65,100	3,700	61,400	3,161,200	61,400	2,500,000	15,800	2,724,600	212,900	5,453,300
1994-95	63,100	3,800	59,300	3,220,500	59,300	2,500,000	15,800	2,997,100	218,200	5,731,100
1995-96	61,100	3,900	57,200	3,277,700	57,200	2,500,000	15,800	3,296,800	223,700	6,036,300
1996-97	59,100	3,900	55,200	3,332,900	55,200	2,500,000	15,800	3,626,550	229,300	6,371,600
1997-98	57,100	4,000	53,100	3,386,000	53,100	2,500,000	15,800	3,989,200	235,000	6,740,000
1998-99	55,100	4,100	51,000	3,437,000	51,000	2,500,000	15,800	4,388,100	240,900	7,144,800
1999-2000	53,100	4,100	49,000	3,486,000	49,000	2,500,000	15,800	4,826,900	246,900	7,589,600
2000-01	51,100	4,200	46,900	3,532,900	46,900	2,500,000	15,800	5,309,600	253,100	8,078,500
2001-02	49,100	4,200	44,900	3,577,800	44,900	2,500,000	15,800	5,840,500	259,400	8,615,800
			Housed in Annex =		1,077,810	In Olin:				
Comparisons of floor area:		Volumes/square ft.=			30	15	Area at	0.0009	asf/unit	
		Stack area asf =			35,900	166,700	requires	5,081	assignable sq ft	